

7. Reafforestation following windblow damage

7.1 Principles

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Restocking following clearance of windblown timber will usually involve similar techniques to that practised when restocking following conventional harvesting operations.

However the conditions following catastrophic damage such as windblow will often require the adaptation of normal techniques either due to pressure on resources or because of the greater quantities of brash and unharvested timber and the presence of large upturned root plates. These will make access to the site more difficult and tend to favour the use of natural regeneration and possibly direct seeding over planting.

Nonetheless planting is likely to be the most common means of restocking. Whichever techniques are used full consideration should be given to local experience following normal harvesting operations.

The area to be restocked may be confined to the area which has suffered damage but it will often be opportune to clear isolated pockets of standing trees or extend the area to be cleared to a wind firm boundary. The extent to which this is done will depend on the vulnerability of surrounding crops to further damage, the economies of scale from restocking larger areas, ease of subsequent harvesting, the visual impact of the boundaries created and the importance of the remaining trees as a source of seed.

When restocking is by planting there are likely to be constraints on the rate at which programmes can be carried out due to limitations on plant supply. The availability of labour and machinery to carry out site preparation, planting and subsequent maintenance can also be a limitation on the size of programme which can be undertaken.

The first step therefore is to determine what level of planting is achievable with the resources, including plants, which can be made available. If the maximum achievable rate of planting is less than the rate at which sites are likely to be cleared of timber then it will be necessary to set criteria for ranking sites in order of priority for replanting.

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The criteria should include:

- a. risk of invasion of vegetation which will be difficult to control;
- b. likelihood of natural regeneration of an acceptable species;
- c. opportunity cost of not using the site; and
- d. the visual and environmental impact of delaying restocking.

Having decided to restock by planting it is necessary to decide on the species to use. Species should only be selected from those which are well adapted to the site and local climate but the final decision will depend on the benefits which it is intended to produce from the forest whether timber production, protection, visual amenity or wildlife habitat.

The choice should not be dependant on the availability of plants. It will usually be better to delay planting until the right species are available rather than to use unsuitable material.

In order to allow safe and easy access by labour and machinery the aim should be to leave the site unencumbered by root plates and large pieces of timber. This is best done as part of the harvesting operation. All watercourses should be cleared of blockages and if the site is not naturally draining then drains should be dug at sufficient intervals to remove surface water but these must be angled to prevent rapid run off causing erosion.

Since the site has previously carried a tree cover there are unlikely to be major benefits in tree growth from deep cultivation unless there is an iron-pan or indurated layer.

Scarifying or some other form of surface cultivation to expose mineral soil into which the trees can be planted is beneficial on sites with a dense mat of ground vegetation or a deep litter or brash layer. On poorly draining soils in areas of high rain fall a raised planting position encourages more rapid early growth. Control of ground vegetation can also be achieved by cultivation or by the use of herbicides either as a spot, strip or overall application.

Because of the risk of erosion cultivation should not be carried out in areas subject to high rainfall on steep slopes with friable soils. In extreme cases it may be necessary to take special measures to prevent erosion including contouring of brash and harvesting residues.

In Southern Europe and especially along the Mediterranean coast summer drought can be a major problem in restocking. Water retention can be improved by terracing hillsides using bulldozers. Although expensive it may be the most effective means of achieving establishment and early growth on these difficult sites.

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7.2 Planting techniques

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The planting technique used will depend on whether the trees are bare root or container grown. All bare root material is vulnerable in the period between lifting in the nursery and becoming established in the forest.

The time between lifting and planting should be minimised but lifting must take place when the plants are dormant while planting should take place when the site is suitable for tree survival and growth which means avoiding periods of frost or periods when the plants are likely to suffer drought conditions. Cold storage of plants allows the planting season to be extended but at every stage between lifting and final planting plants must be handled with care.

Containerised stock is less vulnerable as the plants are planted still in their growth medium but they are generally more expensive to produce than bare root material. They are also usually smaller and less robust making them more vulnerable to attack by insects and mammals or competition from weeds. However, their shorter production period - usually one growing season - means that supplies can be increased more rapidly than bare root material which may require 2-3 years in a nursery.

The optimum spacing of plants will vary with species, expected plant survival and establishment techniques. If timber production is important then for most species a density of 1,800-2,500 trees per hectare at time of canopy closure is usually desirable. Closer spacing than 2,500 trees per hectare is more expensive without giving compensating gains while wider spacing than 1,800 trees per hectare leads to reductions in volume production and, for faster growing species, a reduction in wood quality.

If timber production is not important then wider spacing can be acceptable but will usually extend the period before canopy closure takes place.

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On restock sites young plants in central and northern European countries will often be vulnerable to attack by Hylobius weevils and Hylastes beetles. These cause death of the young trees by ring barking the stem at or just above ground level.

The most effective means of control are by treatment with an insecticide before planting, either by dipping in an insecticide solution or by top spraying. Post planting spraying for a further year or two may be necessary in order to avoid later damage.

7.4 Protection against mammals

Protection against mammals such as rabbits, hare, deer and farm stock may also be necessary depending on the vulnerability of the planted species and the population pressures. Fencing is the most certain means of protection but if the areas being restocked are small and scattered then the cost will be high.

Reducing the numbers of wild animals which harm young trees can be carried out by shooting or in the case of smaller mammals by trapping. Control of domestic stock is best achieved with the cooperation of the animals owners.

7.5 Weed control

Weeds compete with young trees for moisture, light and nutrients reducing height growth and can cause deaths by smothering. Control can be carried out using herbicides either before planting or subsequently or by some form of cultivation to produce a weed free medium for the young plants.

Where herbicides are used a residual herbicide which has an effect for more than one growing season will be more cost effective than those which have a short-term effect.

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7.6 Use of natural regeneration

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Natural regeneration can be an effective means of restocking following windblow and has the advantages that it reduces the need for site clearance and preparation making less demands on labour at a time when this could be in short supply following catastrophic damage and does not require the production of plants from a nursery.

Where damage to existing forests has been total and widespread there will be little chance of sufficient seed being produced subsequently to give full stocking. However, seed may already be present in the soil only requiring heat and moisture to promote germination and growth. In other cases seedlings may be already present ready to grow rapidly when light reaches them following removal of the over storey.

Natural regeneration should only be used if this will produce a tree cover of an acceptable species. In some cases less valuable pioneer species may invade rapidly. If this occurs consideration should be given to replanting with a more valuable species rather than automatically accepting what nature provides.

Direct seeding is seldom used for restocking as losses of seed to birds and small mammals are high and survival of young seedlings low. It is unlikely that this will be used unless its success has been demonstrated on similar sites in the area and there is a plentiful supply of collected seed. It does however have the merit of reducing the need to put labour and machinery onto what will often be difficult sites.

